

Application No. 10/620,898
Response to Office Action

Customer No. 01933

Listing of Claims:

Claims 1-24 (Amended).

25. (New) A diesel engine comprising:

a supercharger for pressurizing outside air and supplying the pressurized air as charge air into combustion chambers;

5 a first heat exchanger, provided in a charge air channel extending from an outlet of the supercharger on a compressor side of the supercharger, for receiving a first medium and for exchanging heat with the charge air from the outlet of the supercharger;

10 a second heat exchanger, provided in the charge air channel, for receiving a second medium having a higher temperature than the first medium and for exchanging heat with the charge air from an outlet of the first heat exchanger; and

fuel injection timing control means for controlling a fuel
15 injection timing of a fuel;

wherein the fuel injection timing control means advances the fuel injection timing for a predetermined period of time when an engine load on the diesel engine is shifted to a low load from a high load and decreases to a predetermined level.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

26. (New) The diesel engine according to claim 25, further comprising charge air temperature detecting means for detecting a temperature of the charge air;

5 wherein the fuel injection timing control means controls the fuel injection timing based on a detection signal from the charge air temperature detecting means.

27. (New) The diesel engine according to claim 26, further comprising reduced cylinder operation control means for stopping fuel supply to at least one of the combustion chambers when the engine load decreases to the predetermined level.

28. (New) The diesel engine according to claim 27, wherein the fuel comprises a water emulsion fuel.

29. (New) The diesel engine according to claim 28, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

5 wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

Application No. 10/620,898
Response to Office Action

Customer No. 01933

10 wherein when the fuel injection timing control means
advances the fuel injection timing for the predetermined period
of time, the flow of the second medium to the second heat
exchanger is increased by the flow control means.

30. (New) The diesel engine according to claim 29, wherein
the diesel engine comprises a water cooling diesel using cooling
water, and the first medium comprises outside air, and the second
medium comprises the cooling water.

31. (New) The diesel engine according to claim 27, further
comprising flow control means for controlling a flow of the
second medium into the second heat exchanger;

5 wherein the flow control means (i) at least one of reduces
and eliminates the flow of the second medium into the second heat
exchanger when the engine load exceeds the predetermined level,
and (ii) increases the flow of the second medium to the second
heat exchanger when the engine load decreases to the
predetermined level; and

10 wherein when the fuel injection timing control means
advances the fuel injection timing for the predetermined period
of time, the flow of the second medium to the second heat
exchanger is increased by the flow control means.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

32. (New) The diesel engine according to claim 31, wherein the diesel engine comprises a water-cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

33. (New) The diesel engine according to claim 26, wherein the fuel comprises a water emulsion fuel.

34. (New) The diesel engine according to claim 33, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

35. (New) The diesel engine according to claim 34, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

36. (New) The diesel engine according to claim 26, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

37. (New) The diesel engine according to claim 36, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

38. (New) The diesel engine according to claim 25, further comprising reduced cylinder operation control means for stopping fuel supply to at least one of the combustion chambers when the engine load decreases to the predetermined level.

39. (New) The diesel engine according to claim 38, wherein the fuel comprises a water emulsion fuel.

40. (New) The diesel engine according to claim 39, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

41. (New) The diesel engine according to claim 42, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

42. (New) The diesel engine according to claim 38, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

43. (New) The diesel engine according to claim 42, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

44. (New) The diesel engine according to claim 25, wherein the fuel comprises a water emulsion fuel.

45. (New) The diesel engine according to claim 44, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

46. (New) The diesel engine according to claim 45, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.

Application No. 10/620,898
Response to Office Action

Customer No. 01933

47. (New) The diesel engine according to claim 25, further comprising flow control means for controlling a flow of the second medium into the second heat exchanger;

wherein the flow control means (i) at least one of reduces and eliminates the flow of the second medium into the second heat exchanger when the engine load exceeds the predetermined level, and (ii) increases the flow of the second medium to the second heat exchanger when the engine load decreases to the predetermined level; and

wherein when the fuel injection timing control means advances the fuel injection timing for the predetermined period of time, the flow of the second medium to the second heat exchanger is increased by the flow control means.

48. (New) The diesel engine according to claim 47, wherein the diesel engine comprises a water cooling diesel using cooling water, and the first medium comprises outside air, and the second medium comprises the cooling water.